



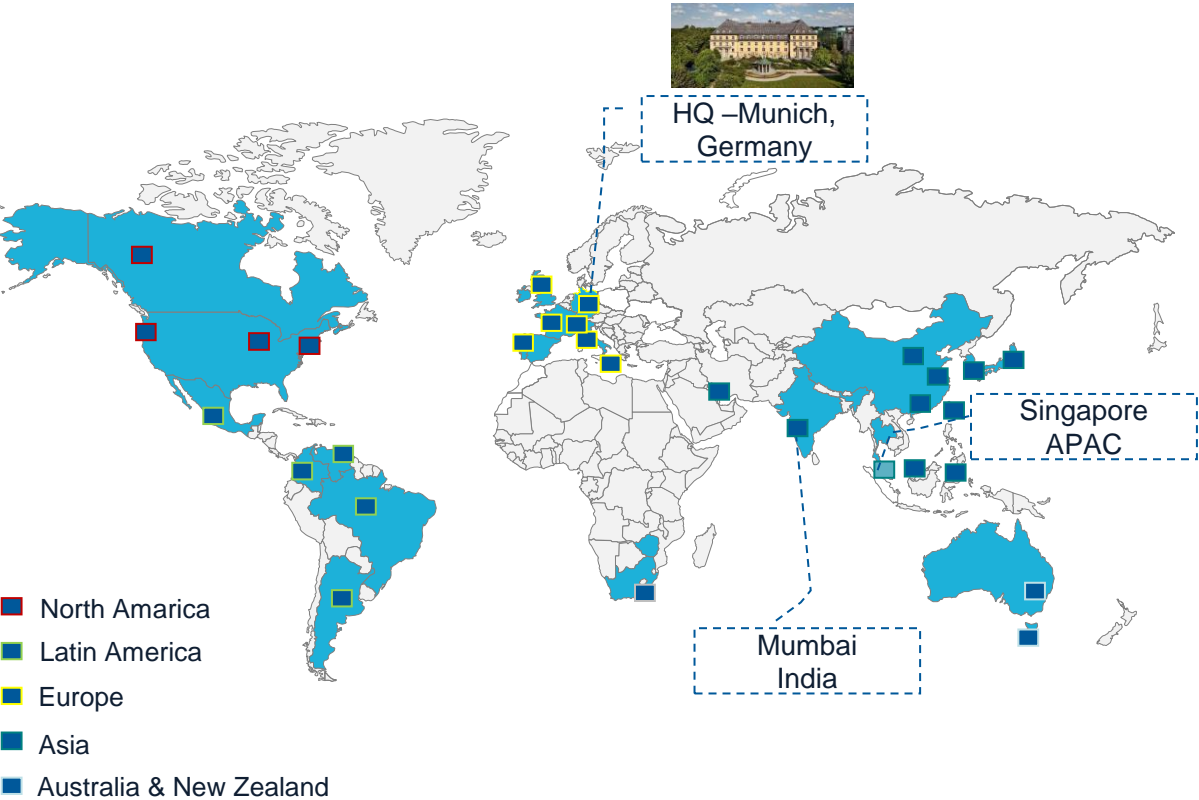
AgroView

Source: <https://unsplash.com/s/photos/agriculture>

Enabling Accessibility, Affordability and Transparency

October 2023

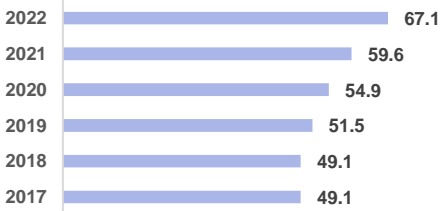




Munich Re (Group)

- ~Founded 1880
- ~Revenue: € 67.1bn¹
- ~Assets under mgt: € 240.3bn
- ~41,000 employees

Revenue (in € bn)

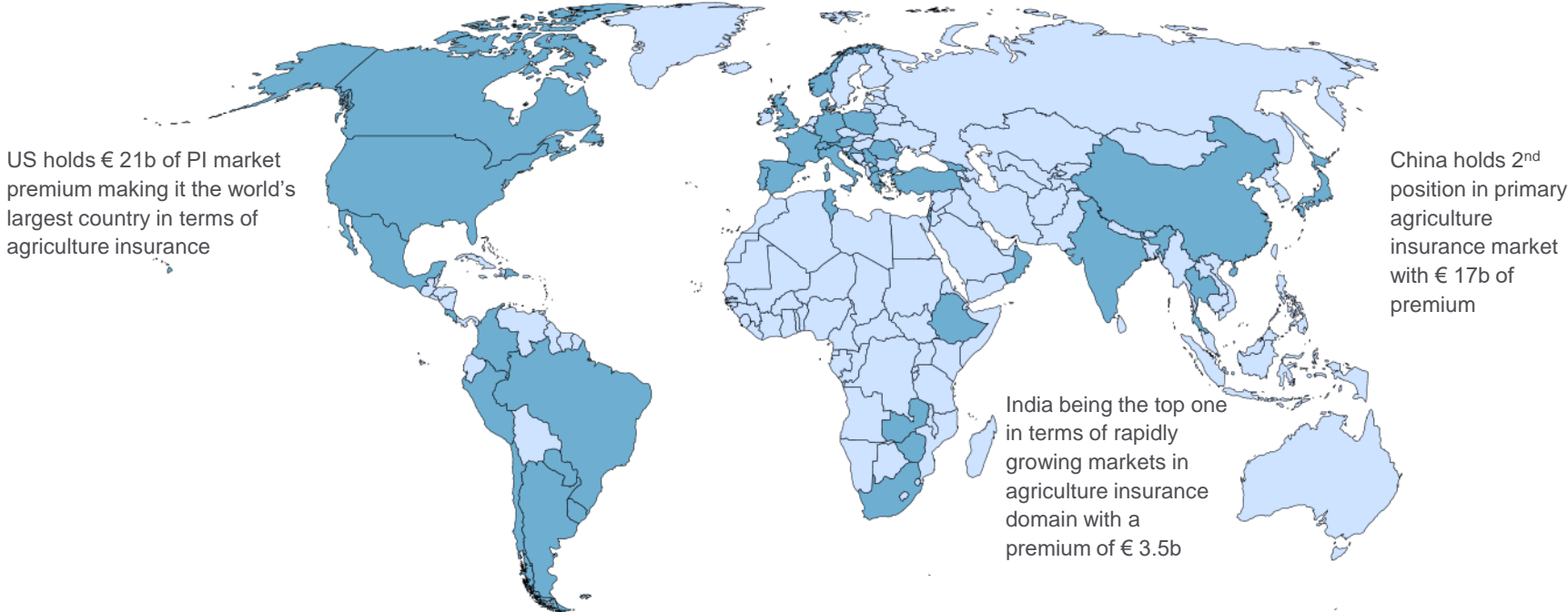


Rating

A.M Best	A+ (Superior)	stable
Fitch	AA (Very Strong)	stable
Moody's	Aa3 (Excellent)	stable
S&P	AA- (Very Strong)	stable

1. Nos. as of 31st Dec 2022

Strong presence in over 40 countries across the world – top 5 being USA, Brazil, India, China and Thailand



US holds € 21b of PI market premium making it the world's largest country in terms of agriculture insurance

China holds 2nd position in primary agriculture insurance market with € 17b of premium

India being the top one in terms of rapidly growing markets in agriculture insurance domain with a premium of € 3.5b

Importance of Agriculture Insurance

Farmers

Stability in income, minimal debts, Risk awareness and mitigation



Economy

Raise and secure farm income which generates demand in rural areas and in turn helps in growth of economy



Government

To ensure sustenance of farmers and farming activities which is important for food security



Banks

Farmers timely repay their loans thus lower NPA's and continuous credit cycle



Agriculture is our wisest pursuit, because it will in the end contribute most to real wealth, good morals & happiness – Thomas Jefferson



Farmers

- **Smooth** enrolment process
- **Ease** in reporting loss
- **Faster** settlement of claims
- **Better** communication
- **Transparent** processes



Government & Regulator

- **Ease of** monitoring the insurance program
- **Transparency & Efficiency** in the loss assessment
- **Timely implementation** of scheme
- **Long term sustainability** of the Insurance program



Insurance Companies

- **Real time** portfolio monitoring
- **Risk** assessment
- **Increase** farmer enrolment
- **More ground control** and tracking
- **Automated** and **faster** claim payment



Product	Coverage	Pros	Cons
Yield Protection	Production Loss	<ul style="list-style-type: none"> • Accurate compensation • Flexibility of coverage like pest & diseases, destruction by wild animals can also be covered at various deductible and indemnity levels 	<ul style="list-style-type: none"> • Assessment of claims require high manpower hence high implementation cost • Product development require past yield data at the settlement level thus low accessibility • Potential of moral hazard
Revenue Protection	Revenue loss due to increase or decrease in price, low yield or combination of both	<ul style="list-style-type: none"> • Comprehensive coverage of income 	<ul style="list-style-type: none"> • Price risk can only be covered when there is reliable source of price is available • High premium cost
Parametric	Production Loss due to adverse weather conditions	<ul style="list-style-type: none"> • Ease of implementation • Ease in integration of technology • Faster claim settlements • Reduced moral hazard • More affordable 	<ul style="list-style-type: none"> • Basis risk • Availability of weather data • Limited Coverage • Difficulty in Parameter Determination

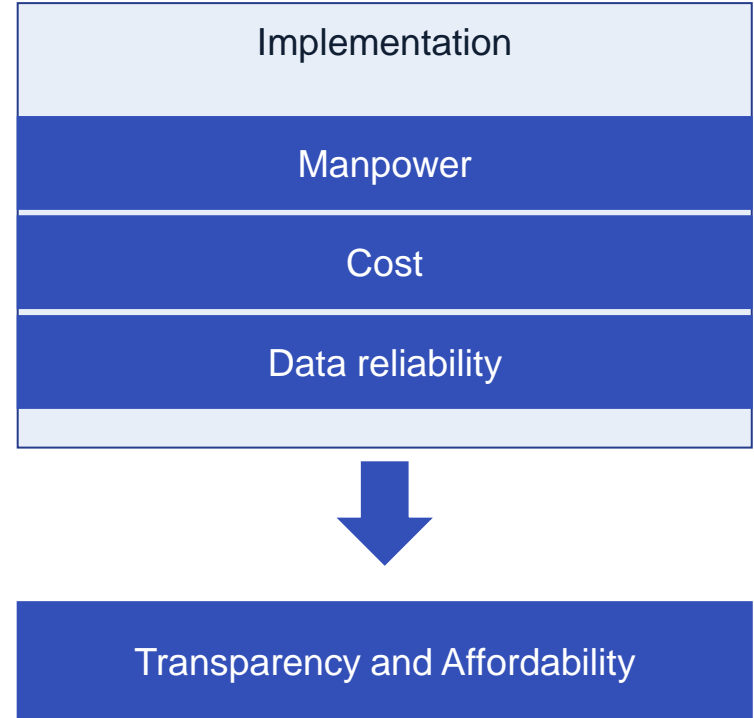
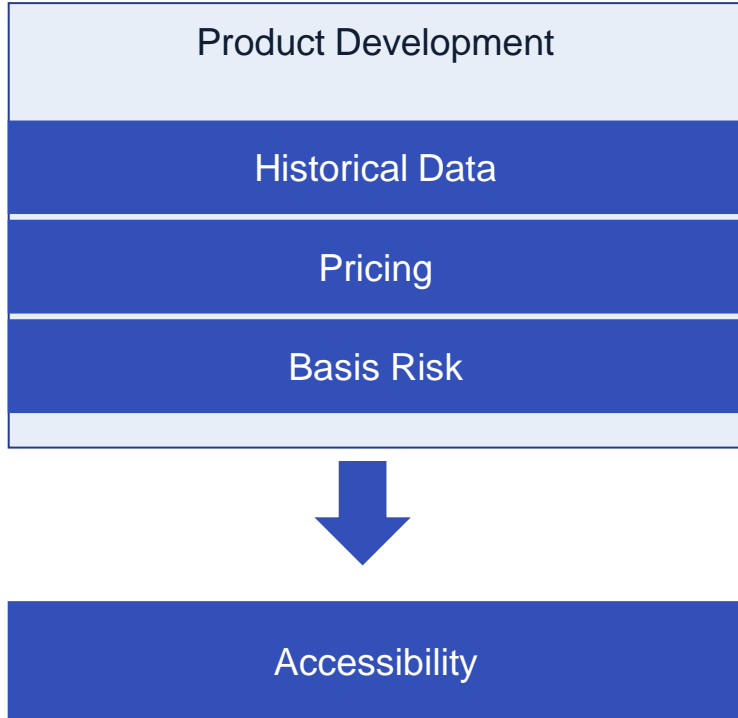
Yield Based Assessment

- **Individual farms** can be assessed based on yield for large farms
- **Area-based** yield assessment is done by performing random sample crop-cutting experiments and averages of the samples used for claim settlement.
- **Yield estimation using technology** like satellite and weather data to predict crop yield and paying claims based on that data.

Index-based and Double Trigger

- A calamity declaration followed by loss assessment. Loss assessment can be by crop-cutting, harvester data, or eye estimates. Eye estimates are generally less reliable & subject to disputes.
- Claim calculation on a pre-defined index of weather or satellite parameters from independent data sources

Challenges



To handle the challenges of accessibility, affordability and transparency we developed a suite of solution which helps from product development to implementation



REVA

- REVA (Risk Evaluation Tool) is a web-based **Primary risk pricing tool**.
- Stochastic calculation of cat loading and heterogeneity instead of a spreadsheet-based deterministic approach
- Historical yield data is available in the database which is linked to the platform
- **Soft factors** i.e. weather forecast, farm management practices, ground-level expertise, and specific risk are also **incorporated quantitatively**



MR Capture

- **Mobile app** designed to capture and digitize all the field activities data which are then mapped to the exposure and coverage data to generate a near real-time update on the portfolio
- Effectively captures activities like **Crop health monitoring (CHM), loss surveys (CLS), and yield estimations (CCE)**
- Helps insurance companies to manage their manpower efficiently
- **Triggers daily reports** for tracking field activities and alerts when the **LR is higher** than expected.



AgroView

- A **webGIS**-based platform that utilizes **satellite and weather data** to monitor in-season crop health, and conduct risk assessments across portfolios based on current and historical data
- **Exposure mapping** of all key clients to provide analytics customized for their portfolio
- Fortnightly portfolio performance reports at client and state level
- Reports present an overall seasonal summary and then detail it up to the lowest administrative level

AgroView is a WebGIS-based crop monitoring platform



Satellite and Weather data integration



Interactive visualization of thematic map layers of crop health, crop water stress and weather (drought/flood) indices



In-depth information on various spatial scales - National level to field level information



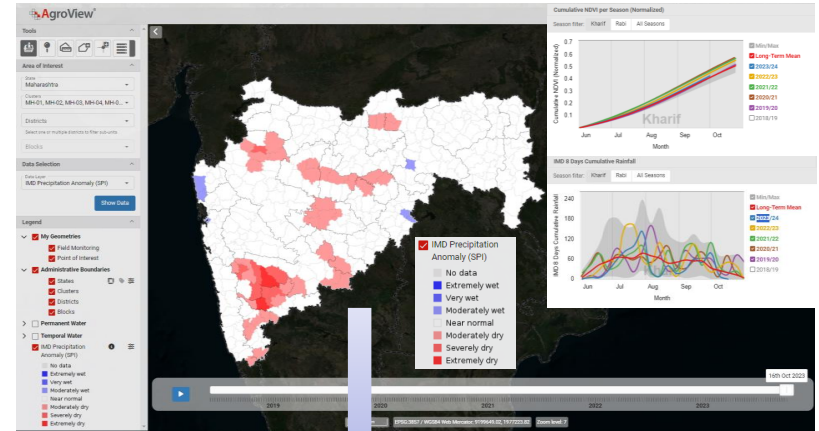
Crop health monitoring at every 6 days interval, automated report generation at the fortnightly interval - Alerts on anomalies



Time Series Data – From Historic to Current



Precise, timely, and reliable information



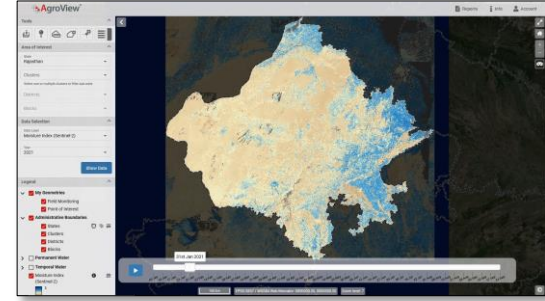
Crop Development Indicators



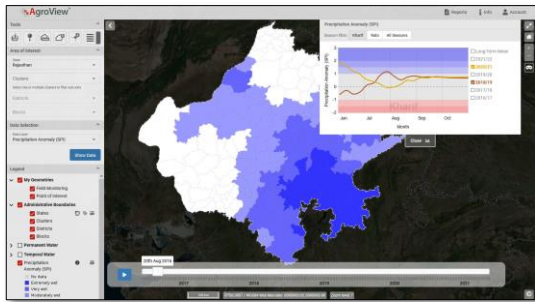
Vegetation Density



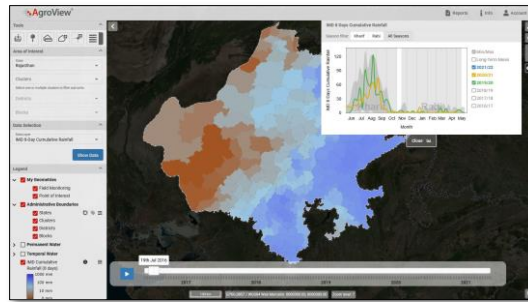
Vegetation Health



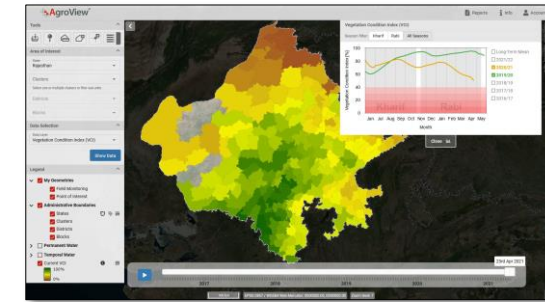
Moisture Indicator



Precipitation Anomaly



Accumulated Precipitation



Drought Indicator

AgroView is a WebGIS-based crop monitoring platform

The screenshot shows the AgroView web interface. On the left is a sidebar with navigation tools, a map of Maharashtra with red and blue shaded regions, and a legend for 'IMD Precipitation Anomaly (SPI)'. The legend includes categories: No data, Extremely wet, Very wet, Moderately wet, Near normal, Moderately dry, Severely dry, and Extremely dry. In the center, there are two line charts. The top chart is titled 'Cumulative NDVI per Season (Normalized)' for the 'Kharif' season, showing data for years 2023/24, 2022/23, 2021/22, 2020/21, 2019/20, and 2018/19. The bottom chart is titled 'IMD 9 Days Cumulative Rainfall' for the 'Kharif' season, showing daily rainfall for the same years. A blue arrow points from the 2022/23 data point in the rainfall chart to the right-hand image.

This section shows a satellite image of a crop field with a green polygon highlighting a specific area. To the right is a line graph titled 'Sentinel-2 L2A Data (0% cloud coverage) - NDVI'. The graph plots NDVI values from January to December for the years 2023/24, 2021/22, 2020/21, 2019/20, and 2018/19. The 2023/24 data is highlighted in blue. The graph shows a seasonal cycle with a peak in March and a trough in June. A legend on the right indicates 'Min/Max' and 'Mean' values.



Crop Health Monitoring

Helps in real time portfolio development monitoring



Crop Loss Surveys

Real time Loss surveys monitoring and timely execution as per guidelines



Crop Cutting Experiment

Helps in real time Loss Ratio estimation and judicious decision making



Farm Georeferencing

All activities are recorded with Geotagged field polygon that helps in satellite based data analysis



Manpower Tracking

Ground manpower productivity analysis and Vendor Management



Data Analytics

Decision Support System to monitor Loss Ratio in real time to minimize the fraudulent activity



MR Capture: CHM Report

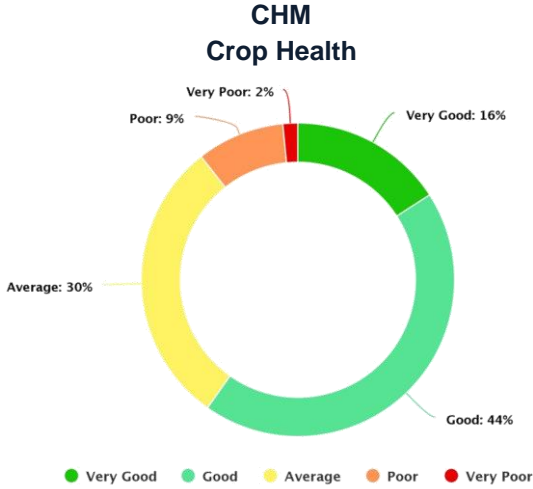


Clients - 4

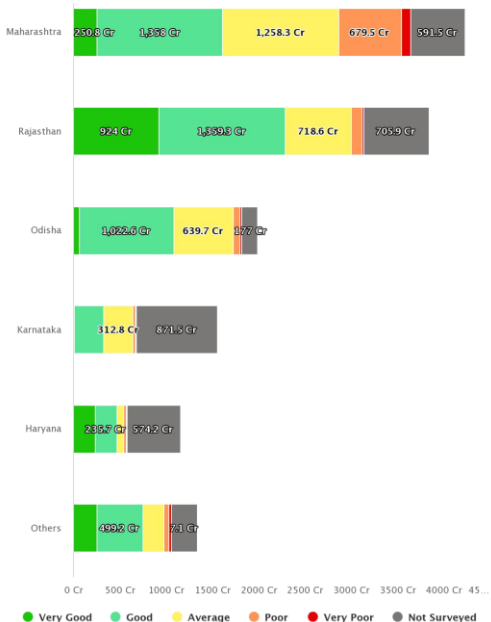
App Users > 7k

Data collected >900k

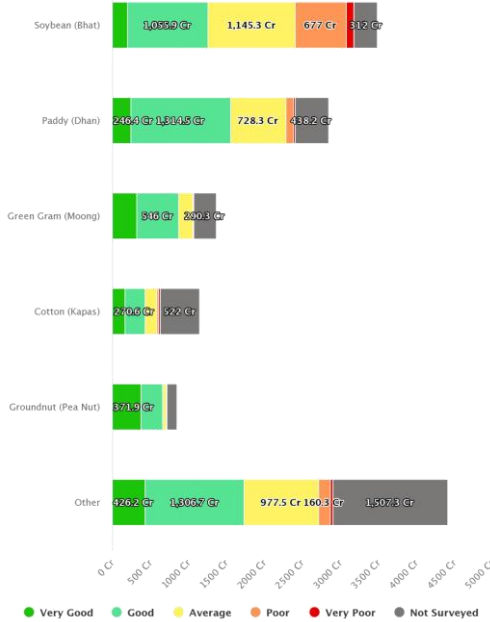
Covered: 8 States, 79 Districts, 707 Sub-Districts



State wise Crop Health



Crop wise Health



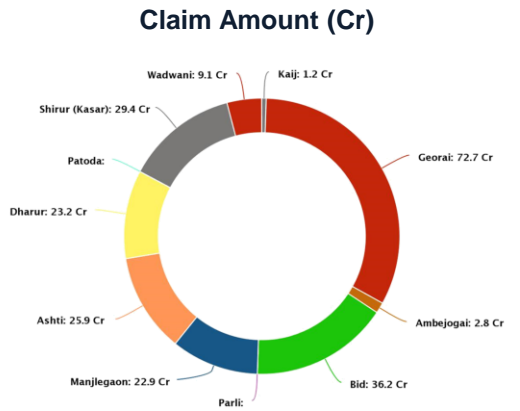
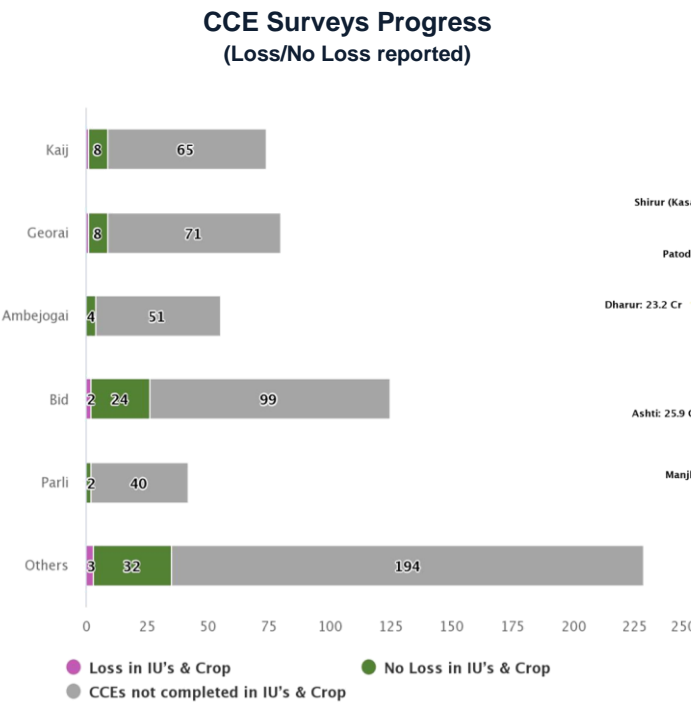
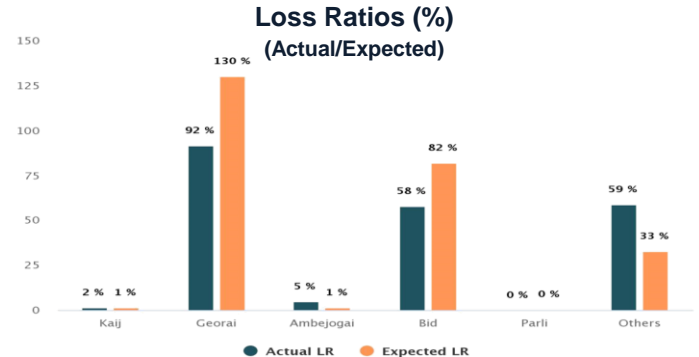
MR Capture: CCE Report

Clients - 4

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Integration of AgroView and MR Capture

- Integration of AgroView and MR Capture application for mutual data exchange
- Satellite based & field augmented crop loss assessment
- Field level historical crop information and validation



Crop Yield Estimation

- Collected data will be used to estimate the field level crop yield from the satellite data
- Crop acreage estimation

Field Level Crop Loss Assessment

- Development of Field level crop loss assessment product
- Loss assessment using ML and deep learning model through Remote Sensing data
- Historical database would help in designing and pricing of product

Historical Data Repository

- Ground truth database will help in designing of New satellite index based insurance products.
- Database will help in pricing, loss trend analysis



Thank You..!!